Hydrogeology at Hanford

Be a problem solver and decision maker *for the environment.*

WASHINGTON STATE DEPARTMENT OF ECOLOGY

The Columbia Basin is a geologist's dream...Missoula floods, basalt flows, volcanism.

Do you have what it takes to be a hydrogeologist at Hanford?

Hydrogeologists at Hanford are required to be experts in the technical field and possess strong interpersonal communication skills. Ecology staff work closely with federal and state agencies, local government, and private contract companies. They must communicate regulatory requirements for monitoring and remediation of contaminated sites. They must be highly skilled in geology, hydrology, chemistry, math, physics, and fluid mechanics; and be able to communicate the complex concepts of Hanford's hydrogeology to a member of the public.

Do you want to be a part of a hydrogeologist team that leads the nuclear waste field in innovative technologies?

Ecology assesses and recommends new technologies that will aid in the cleanup of contaminated water. Hydrogeologists at Hanford select and design appropriate corrective measures to stop the spread of contaminants and keep them from getting to groundwater or to slow the movement of contaminants to the Columbia River. The newest technology being tested at Hanford is apatite sequestration. Apatite is a mineral that has the ability to capture and hold radioactive metal contaminants. The apatite has been injected into the soil and aquifer near the Columbia River shoreline. As the groundwater moves toward the river, the apatite absorbs strontium-90 and prevents it from reaching the river.

What is Hanford?

The Hanford Site is a 586 square-mile area located in Washington State. The United States government created Hanford for research and manufacturing operations to make nuclear materials needed to build the first atomic bomb in World War II. Hanford continued to produce nuclear material throughout the Cold War. While critical to our nation's security, these activities left tons of chemical and nuclear waste in the buildings, soil, and groundwater. These activities also resulted in the production of billions of gallons of contaminated waste water.

Today, Hanford is one of the largest environmental cleanup projects in the world. About 10% of the land area and 80 square-miles of groundwater are contaminated. Cleanup includes collecting, removing, and/or safely storing chemically toxic and radioactive materials. Activities involve soil and groundwater cleanup and demolishing old facilities to ensure the safety of future generations.

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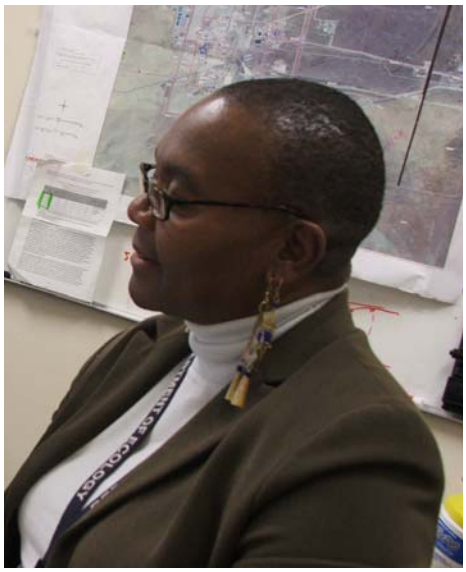
What do hydrogeologists do at Hanford?

- Perform field investigations of the geology and the chemical and physical properties of groundwater beneath the Hanford Site.
- Characterize the aquifer systems, including the communication between the supra-basalt, unconfined aquifer, and the confined aquifer.
- Study the geology beneath the Hanford Site to determine the pathways that groundwater will take to reach the river.
- Plan, locate, and design groundwater monitoring wells that meet regulatory requirements.
- Sample and evaluate data from groundwater monitoring wells to determine changing groundwater flow directions, growth of contaminant plumes, and movement of contaminants from the vadose zone.
- Characterize the unsaturated zone where many waste discharges have occurred.
- Provide objective technical reviews to ensure that commitments and regulatory requirements that will contribute to the remediation and cleanup of the site are fulfilled.
- Protect the natural resources of Washington State.

As a hydrogeologist at Hanford, Jackson provides technical oversight for cleanup of the radioactive and hazardous waste groundwater contamination. For 15 years, she has used her knowledge of the hydrogeologic environment at Hanford to carry out Ecology's mission of protecting human health and the environment. Jackson recommends hydrogeologists learn to communicate effectively with diverse cultures to increase their skill base.



"This effort entails collaboration and cooperation with the U.S. Department of Energy and its contractors, and the community and stakeholders, in order to uphold Ecology's legal mandate, to protect human health and the environment."

Zelma Jackson, Hydrogeologist
Washington State Department of Ecology

Clastic injection dikes are common in Hanford Site sediments and present challenges to cleanup decisions.

For more information on hydrogeology careers with the Washington State Department of Ecology at Hanford, please visit www.ecy.wa.gov/jobs/jobs.html.

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